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Abstract

In May 1998 Purdue University began a business process redesign project focused on improving the university's procurement practices. The project's goal was to improve the procurement process, considering all goods and services required by a university employee to do his or her job. The university employs more than 10,000 staff and faculty. Since inception, the project team has completed preliminary analysis, chosen a product for use to implement the new process, and has begun a phased deployment to the university community. Using Purdue's Procurement Redesign Project as a case study, this paper will explore how traditional methods of process redesign must be tailored to work for non-profit organizations in general and particularly for higher education. The primary goal is to explore how the theories of Business Process Redesign must be adjusted when applied in non-standard environments. This paper was written while the primary author was working as a developer on the project as well as enrolled in courses exploring the intersection of business and technology.

Keywords: BPR, e-business, procurement, higher education, public sector

Case History

In 1997 two staff members of Purdue University proposed redesigning the university's procurement process. There were five issues driving the analysis of the procurement process: the expense of the process, the speed of the process, the staff required to complete the process, the challenge of obtaining accurate and timely data about the process, and the customer perception of the process. The goal of the analysis and redesign was to make significant changes in each of these five areas.

An obvious question asked at the beginning was, "Since the top priority of a university is generally the students, why spend any time, effort, and money on a business-side improvement?" There is a serious cost associated with processing a purchasing requisition. In a typical company or organization, this cost can range from $50 to $150 depending on the materials and staff involved. Given this cost associated with each requisition that is processed, improving the purchasing process can significantly affect the operational costs of the company. Making such a change, therefore, can have an effect on the students because some part of the university fees includes paying for operational costs. In addition, the improvements can have a direct impact when it becomes easier for the faculty and staff to obtain the everyday materials that they need to do their jobs.

To frame the redesign efforts, some high-level goals were established at the beginning. The primary goal was to produce a single system for ordering all goods and services required for an employee to do his or her job. There were additional requirements about the system itself, such as being flexible enough to handle ad-hoc purchases and not requiring the university to work with a specific set of suppliers. The hope was that whatever system was chosen to implement the redesign plans, there would not be unnecessary limitations imposed on university business practices. The actual system needed to have the capability to automate university business practices, so that the routing of documents within the system could be handled without intervention. The reason for this was to remove the burden from the user of knowing where to send his or her documents – at the university, faculty are hired to know their subject area, not procurement workflow. Finally, the process experts in purchasing and the business community at large hoped that a new system could provide them with accurate data in a timely fashion. A guiding concept for all of these goals, hopes, and dreams for a new system was the ability to promote procurement as a seamless university function – one stop shopping for all of the user's needs.

The initial project team was formalized in May 1998. The composition was split between business side and technical side members. The team began by documenting the "As Is" process, both through their own expertise and by consulting with business experts and process managers. A benchmarking activity was conducted to see how other higher education institutions were conducting their procurement processes. However, at that time there were no colleges or universities doing anything similar to

what Purdue wanted to do. Some institutions were using a paper-based process, some were using procurement applications developed in house, and some were preparing to implement PeopleSoft and planned to use some of that system's procurement functionality, however no other institution had the goal of purchasing an application specifically for e-Procurement. Research began on the technology side to establish the range of procurement solutions that were available. At the time, there were about 15 providers in the e-Procurement market. Based on the "As Is" model and the application options the team had discovered, the "To Be" model was proposed. This model was presented to higher management and the scope and budget for the project were revised.

In December 1998 the request-for-proposal (RFP) was finalized and submitted to three vendors. One element unique to Purdue's approach was developing a "training manual" that could be used for the proposed system and submitting that along with the RFP. Of course, at this point in the process there was no actual system to train university employees to use. However, the manual was created at this stage so that the vendors could see how the project team hoped that a user would interact with a procurement system when it was implemented. The responses to the RFP were evaluated in January 1999 and based on the results one vendor was asked to conduct an on-site demonstration. Based on this demonstration (as well as visits to three other vendors), the university decided to work with Ariba, Inc.

After the application package was selected, two additional technical staff members were added to the team. The system was installed at the main campus in May 1999 and configuration began. The university partnered with Deloitte Consulting to implement the system. Deloitte provided two business analysts, a developer, and a project manager. Two Ariba resources were available as well to assist during this phase. A "conference room pilot" was conducted in September 1999. The system was made available in a limited set of locations around campus. Users could come to the conference rooms to try the system out. The system was not in production status, so no transactions were completed – no orders were sent out. The goal for the pilot was to get user feedback concerning the changes that had been made to the application, as well as to help the users keep pace with the process change. Many identified issues were resolved and further changes were implemented. The system was tested extensively during this time period by both developers and the business analysts. A simulated usage test was conducted in February 2000. This was a structured time for a large number of users from the departments that would be included in the first phase of deployment to work in the system as they normally would on a daily basis. The main difference between the simulation test and the ongoing cycles of testing was the number of users. The simulation test was an opportunity to have a greater number of users on the system at one time. The testing period was spread over several days, and included scripted testing as well as more random "trying to break it" actions. Many issues identified during this phase were corrected and re-tested. Based on the results of the simulation test, and the comfort level of both management and the user community, phased deployment began in April 2000.

Four university departments were chosen as pilot areas for the system. The pilot areas were selected by the university business community in conjunction with the project team to stress various aspects of the system. The system was implemented in a phased rollout, with each area being brought on one at a time over a period of several weeks. During the initial rollout phase, all project team members were available for phone support. The team also visited the first pilot area when that department was going live to experience the joy and the pain of the moment along with the end users.

The four pilot departments were Physical Facilities, Aviation Technology, Chemistry, and the North Central Campus, listed in the order of deployment. The material expeditors in the Physical Facilities department place a high number of orders on a daily basis, typically requesting maintenance, repair, and operations (MRO) supplies from either stockless suppliers or from University Stores, an internal campus supplier. The Aviation Technology department routinely places high dollar orders for items such as simulators, airplanes and plane parts, etc. Users in this area employ numerous purchasing cards on a regular basis, so the purchasing card reconciliation component of the system could be well tested here. Chemistry is a research area, so requisitions from this department could be expensed on sponsored program accounts according to specific research projects. Chemistry also has a departmental stores operation, so it was an opportunity to test central receiving. This area has a better chance than others of ordering restricted commodities (such as radioactive materials) so this allowed for demonstration of the commodity rule's impact on a requisition's approval routing. Finally, the North Central Campus was chosen to show that the system would be accessible from a satellite campus location.

To help the users adapt to the new process and the new system, there has been an ongoing training effort conducted by the Process Implementation (PI) team. This team is composed of business analysts representing various functional areas. In many cases the team has found it necessary to spend time educating the users about university business practices before showing the users how to interact with the actual system. Due to the limited number of team members available for training and the size of the eventual user population, the team has followed a "train the trainer" approach. Resident Experts were identified in each pilot area, with the goal being that the end users in a pilot area would be able to contact that area's expert first before being referred to either the project team or a help desk when that is created. While the initial responsibility of the PI team was training, the team has also been serving as an interim help desk. In addition to answering questions, the PI team has collected user feedback and passed that on to the project team as concerns arose or new customization needs were identified.

To follow up on the implementation in the pilot areas, the PI team hosted feedback sessions to gather input from the users regarding their response to the system. The issues have ranged from legitimate concerns about the design and functionality of the system to users choosing to not accept the new process medium – moving from paper to electronic forms. Each issue was evaluated as it was passed to the project team. First the team determined the validity of the issue to make sure the concern was about the system and not the process, because process issues were being handled at a higher level of management at this point. Then the team tried to reproduce the problem that was being reported so that the issue could be addressed. Finally the issue was prioritized (with input from the management group) to determine severity of impact to the system and how to dedicate resolution efforts. Some issues were resolved through changing the process to fit the functionality and some were resolved through further configuration of the system to better fit the process. In a few cases the vendor's support was required. A few of the issues were left as unresolved, for the most part because the desired functionality was promised in a future release of the application.

Currently, the project team is working with the vendor to resolve the last lingering issues before deploying to the next pilot areas. The team is also preparing for additional development efforts. One of the reasons the application was selected as a medium for the process was the capability to extend the application's basic functionality. As deployment continues, the hope is that additional procurement-related functions such as requests for service from Physical Facilities and requests for travel approval and reimbursement could be added to the system. Because the system will be widely used by the university (since nearly every employee would need to request goods or services at some point in time during their employment), there has been some discussion of extending the system to collect and route data for non-procurement related business processes. Some development work has been done for HR data collection, but it has not been moved to production.

Regarding current staffing, the team composition has retained its cross-functional character. The project team includes the following roles: Project Manager, System Administrator, Catalog Manager, Application Group Leader, Applications / Systems Analyst, Data Analyst, Lead Designer, and two Programmer / Analysts. The support of a Database Administrator, a Unix Systems Administrator, and a Webmaster is available when required. Additional business experts participate in team meetings and are called on to guide and shape the development of the application. Care has been taken to continue to include the business community as the implementation progresses.

System Statistics

As mentioned previously, the phased deployment began in April 2000 for the four pilot areas. The following statistics were gathered on October 31, 2000:

Total Number of User Accounts	1,502
Active Users	507
Suppliers	679
Hosted Catalogs	5
Number of Orders	16,821
Total Spend Through Ariba	$4.8 million

This is a summary view of how the four pilot departments have used the system since deployment. While a large number of user accounts have been created, only about a third of the users have actually accessed the system. Although a significant number of suppliers have been entered, many of them may be used infrequently. One of the pilot departments (physical facilities) routinely places a large number of orders using the University Stores operation, which is a supplier with a hosted catalog. If a supplier's catalog is not hosted within the application, the order is ad-hoc, but still will route through the system as a regular requisition. University departments are allowed free choice of suppliers, so the number of suppliers within the system is anticipated to grow. There may be more effort to use an established subset of vendors as more departments use the system. One of the expectations for the system is that the data collection would allow the purchasing department to negotiate more favorable relationships with a set of preferred suppliers.

Business Process Redesign (BPR) – Did It Happen Here?

BPR came into common usage in the early 1990's. Prior to the advent of BPR, many companies were pursuing Total Quality Management (TQM) initiatives. What seems to best distinguish the two are scope and speed. TQM is focused on constantly making small changes that will improve the process. BPR is typically described as a dramatic change in the overall process – a completely new way of doing things.

Although BPR may be losing value as a buzzword, the value of the concept that a business may improve by making radical changes remains. This value is what Purdue University's Procurement Redesign Project hoped to achieve. The question is, was the effort really a process redesign, or was the existing process simply moved to a new medium?

The deployment of the Ariba application has already made real substantial changes in the procurement process. One of the business analysts says that the most significant change has been the "ability to create, route and approve, and get orders" sent to suppliers all in electronic format. This change to the process offers substantial improvement for the end user in terms of time taken to complete the process as well as user involvement and awareness of the process. When implemented with paper, a requisition could languish forgotten on someone's desk. With the new system, the user can see where the requisition is at any point in the process. Another analyst remarked that the university's willingness to accept electronic signatures rather than ink on paper was impressive, so the corporate culture has changed as a result of this initiative.

The general processes of BPR were followed over the course of the project. All of the initial required documentation such as the "As Is" and "To Be" process models was completed. The project was initiated with a cross-functional team, with the team members and process owners working together to create the "To Be" business model.

In many ways, however, the overall process remains unchanged when seen apart from the medium. The new medium does allow for faster processing, and in the case of some multiple required approvals the approvers can view the document in parallel rather than in sequence. The process was streamlined when it was moved to the new medium. One of the analysts cites this as a goal of the redesign efforts – "look at the current processes, see where unnecessary handoffs are."

Non-profit vs. Profit

The drivers for BPR in a non-profit company or organization are very different than those in a typical company. "We have less strict project timelines, and are not constantly pushing to make sales, profits . . . [The] main goals of the project are to increase customer service, streamline business processes, reduce paper, and hopefully realize a reduction in cost." This caused occasional conflict with the partnering organizations during the implementation – it was a contest between quality and schedule. The partnering consultants pushed for less customization and a more aggressive schedule. They were most interested in demonstrating ROI in the shortest amount of time possible. The university was more willing to sacrifice schedule for the sake of being able to implement a system that more closely met the business requirements. There were few compromises made in the ways that the university did business – the greatest impact has been the change of process medium.

There are a number of reasons for the limited changes made to the business process. In some cases, no changes could be made due to legal constraints, such as some expenses only being permissible on certain funds. Other times, the actual process remained the same due to simple resistance to change. Many of the process owners who would feel the impact of the new system had a direct say in how the system would work, and they were less open to change. A business analyst from the project expressed the wish that "the Project Team could have been afforded more autonomy based upon the knowledgeable, cross-functional make-up of the Team who would answer only to a Senior visionary." As it was, the project team may not have had the trust or the freedom required to make truly radical changes in the process.

However, the lack of changes, as seen at this moment, may not indicate a failure of the project. Because of the limited resources available at a non-profit organization, greater caution may be in order when considering what should be changed. Rather than viewing the delivered system as complete, some process guidelines will remain in place until there is a substantial pool of data available for evaluation, and the guidelines may be changed based on that evaluation. Not only is the actual implementation of the system following a phased deployment model, the actual redesign seems also to be occurring in phases.

Common Mistakes

Organizations typically pursue BPR because of the opportunity for radical improvements, but the radical nature of BPR carries an associated risk. Up to 70% of all projects fail to achieve their goals (Mayer). Did the university do anything differently to alter the chances of success? Although a BPR methodology was more strictly followed at the initiation of the project, since the purchase of a system the methodologies have been followed on an "'as needed' basis." This may be a reflection of how the application began to shape the direction of the project. However, this is not to say that all good practices were neglected, "during the design of the business processes for the product, we often referred to this business model to define the details of the process that required change." Clearly the documentation was accessible as needed.

One thing that could have been done differently at Purdue is to focus solely on implementing the basic procurement functionality of the system before exploring the extensible functionality. The application has the capability to be customized to handle other

types of data collection and approval routing. Because of a parallel HR initiative, the university decided to investigate using the system to handle the collection and approval of pre-employment information. This resulted in two separate groups of developers were working within the same system, which added another layer of complexity to moving the system to a fully deployed status. Maintaining a strong focus may have helped to bring the application to deployment sooner.

Conclusion

Viewed in the current status, Purdue University's redesign of the procurement process may not be a striking success. After several years, the system has only been deployed to the initial pilot phase. Many of the business rules guiding the initial process remain the same, the primary difference is that the process now uses a different medium. However, the project definitely has not been a failure. The system is being used, and as additional concerns are addressed, it will eventually be deployed campus-wide. Even in its current status, the new system addresses some of the concerns that drove the redesign effort: data about the process is being made available, the average process cycle time has been reduced, and for the pilot departments, the system does represent a central point of contact for purchasing information. Perhaps this middle-of-the-road approach represents the best that could be hoped for. Risk was minimized, and gains that may have not been immediately realized may still be achieved.

To generalize the experience of the Procurement Redesign Project, one might say that the theories of BPR must be heavily adapted to function outside of the commercial and business environments they were written for. Of course, no theory of business practice should be applied to an entity without tailoring the theory to fit the subject, but the revisions in this case may have been required to be more radical to allow for success. This experience is seen as a useful means of applying the academic theory in a real world setting to better understand the reality of Business Process Redesign.

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